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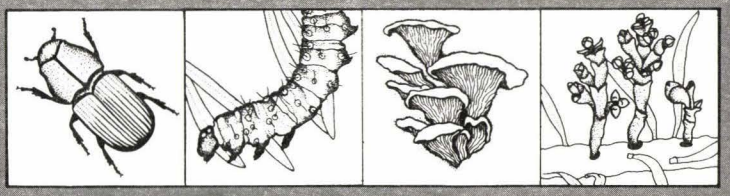
Forest Insect & Disease Management



Report No. 80-17

3450
July 1980

PROGRESS REPORT NO. 1

YAAK AND THOMPSON RIVER DEMONSTRATION AREAS TO MANAGE MOUNTAIN PINE BEETLE IN LODGEPOLE PINE

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ROCKY MOUNTAIN STATION

By

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INTRODUCTION

Mountain pine beetle is the major factor in mortality of lodgepole pine in the Western United States and Canada. In every review of timber loss to insects, mountain pine beetle consistently ranks at the top of the list. It is estimated that more than 90 percent of the lodgepole pine stands in the West have had epidemic infestation, where stands and climate are conducive to brood development.

"Control" of outbreaks is impossible once they become epidemic. Therefore, management is being directed toward protecting green high-risk stands, as well as toward salvaging infested stands.

Proper management can prevent extensive mortality by changing the beetles' food supply, while stands are manipulated to grow at or near optimum capacity compatible with other land management objectives.

Research Work Unit 2201, Intermountain Forest and Range Experiment Station, Ogden, UT, has developed extensive information on mountain pine beetle epidemiology and management. In 1978, two demonstration areas were established with the cooperation of the Plains Ranger District (Lolo NF), Yaak Ranger District (Kootenai NF), Forest Insect and Disease Management (Region 1), and Research Work Unit 2201.

OBJECTIVES

The demonstration was designed to:

1. Apply cutting strategies prior to beetle infestation to prevent an outbreak; and change stand dynamics to reduce epidemic infestations.

2. Use regeneration and postcut techniques to obtain maximum wood and fiber production.

3. Develop knowledge on beetle/host tree interaction and its consequences for these managed stands.

4. Manipulate forest cover to reach full potential for timber production consistent with key values and soil and water quality, which implies maintaining adequate levels of disease-free growing stock of the desired species.

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METHODS

An area of approximately 2,000 acres was selected on each Forest for the demonstration. Each area was divided into units of approximately 10-30 acres. On the Kootenai, 19 units received a cutting strategy and 3 units were designated as checks (figure 1, table 1). On the Lolo, 16 units received a cutting strategy, with 3 designated as checks (figure 2, table 2).

Prior to cutting, each unit was cruised for infested trees. These estimates were obtained by establishing 1/4-acre plots at 5-chain intervals throughout each unit. A hypsometer was used to determine if trees were within plot boundaries. Trees 5 inches d.b.h. and larger were tallied and classed as follows:

0 = Green
1 = Current attack, brood present
2 = 1-year-old attack, brood present
3 = 1-year-old or prior attack
4 = Unsuccessful attack or pitchout; green foliage, pitchtubes present, brood and blue stain absent
5 = Strip attack

Twenty 1/10-acre plots also were established to determine diameter-phloem distribution within the stand. A hypsometer was used to tally trees, which were recorded by d.b.h. Two phloem samples were taken from the opposite sides of each of two trees in each diameter class per plot. Phloem thickness was measured to the nearest one-hundredth of an inch with a steel ruler.

Additional data were collected for site index; habitat type; age and growth rate; elevation; basal area, stems/acre; aspect; slope; and crown competition factor.

Areas were resurveyed for new attacks following cutting in 1979.

Research Work Unit 2201 collected data for 2 years on the Kootenai units and for 1 year on the Lolo units concerning associated insects and emigration/immigration of mountain pine beetle at different crown levels.

RESULTS

All units have been established, cruised, and cut, and the first postcut survey has been made.

Data on infestations and cutting are shown in tables 1 and 2. Each unit will be cruised again following beetle flight in 1980, and attacks/acre will be compared to the number before cutting. Tables 3 and 4 show habitat type, elevation, aspect, slope, and soils type. Data are being collected annually through 1982 to show the relationship between attacks/acre and these factors. Stands will be reevaluated in 1987 and 1992.

Table 1.--Unit Information, Yaak Demonstration Areas, Kootenai NF, 1976-79

Unit No.		Designated cut	Acres	Attacks/acre 1976	1977	1978	1979	Logged MBF
Waper Creek	1	Leave >12" dbh	20	7.6	6.4	15.6	14.7	306.0
	2	Leave 100 BA	16	4.4	1.6	2.4	10.5	64.0
	3	Leave 80 BA	14	6.4	3.6	5.0	4.0	58.0
	4	Check	25	4.6	0.4	7.6	15.3	--
Hensley Creek	1	Cut ≥10" dbh	17	7.2	3.8	3.6	4.8	226.0
	2	Leave 120 BA	16	11.2	2.0	3.4	36.0	206.0
	3	Leave 80 BA	18	2.6	1.6	0.4	17.5	86.0
	4	Cut ≥12" dbh	10	2.8	0.6	3.2	1.3	208.0
	5	Cut ≥12" dbh	14	4.8	0.4	2.0	0.5	86.0
	6	Cut ≥7" dbh	18	1.8	0.2	0.4	3.1	323.0
	7	Cut ≥12" dbh	21	0.8	3.8	13.2	55.1	106.0
Benefield Creek	1	Cut ≥7" dbh	16	1.2	0.4	0.2	Not logged until late winter	207.0
	2	Leave 120 BA	28	0	0	0	0	62.2
	3	Leave 100 BA	19	0.4	0.4	0.2	.8	117.0
	4	Leave 80 BA	16	1.6	0	0.2	0	17.1
	5	Cut ≥10" dbh	16	0.8	1.2	4.4	0	157.9
	6	Cut ≥10" dbh	18	0	0.2	0	0	87.9
	7	Leave 100 BA	14	8.8	1.4	17.2	2.6	145.9
	8	Leave 120 BA	18	0.6	1.8	1.6	0	173.9
	9	Cut ≥7" dbh	17	0.6	0.8	0.2	Not logged until late winter	177.7
	10	Check	23	2.2	5.2	10.8	68.9	--
	11	Check	25	6.0	7.2	16.4	51.6	--

Table 2.--Unit Information, Thompson River Demonstration Areas, Lolo NF, 1976-79

Unit No.	Designated cut	Acres	Attacks/acre 1976	1977	1978	1979	Logged MBF
14A	Cut ≥7" dbh	15	7	22	89	*	210
15	Cut ≥7" dbh	25	164	67.8	127.2	*	200
19	Cut ≥7" dbh	31	--	--	--	*	627
4	Cut ≥10" dbh	19	0.2	1.0	4.2	0.5	15
7	Cut ≥10" dbh	21	0.6	0	1.6	2.2	31
16	Cut ≥10" dbh	20	3.4	13.0	40.2	2.5	0
2	Cut ≥12" dbh	17	0	0	3.6	6.3	18
3	Cut ≥12" dbh	17	0.2	1.0	4.2	**	25
8	Cut ≥12" dbh	15	0.2	0.4	0.2	2.0	20
1	Leave 80 BA	15	0.4	0.8	0.2	0.6	18
12	Leave 80 BA	15	0.2	0	0.4	2.2	20
5	Leave 80 BA	15	0	0	0	0	20
9	Leave 100 BA	18	1.4	1.6	4.8	2.5	Not logged until early spring
11	Leave 100 BA	15	0	0	0	0.3	20
13	Leave 100 BA	22	0.6	1.4	0.2	0	17
6	Leave 120 BA	17	0.2	0.8	1.4	0.4	15
14	Leave 120 BA	15	0.6	0	2.6	1.8	20
10	Leave 120 BA	15	0	0.2	1.6	0.5	15
7A	Check	21	0.6	0	1.6	0	--
18	Check	15	0.6	1.0	5.8	14.2	--
27	Check	21	67.0	63.0	8.4	1.4	--

* end up a clearcut

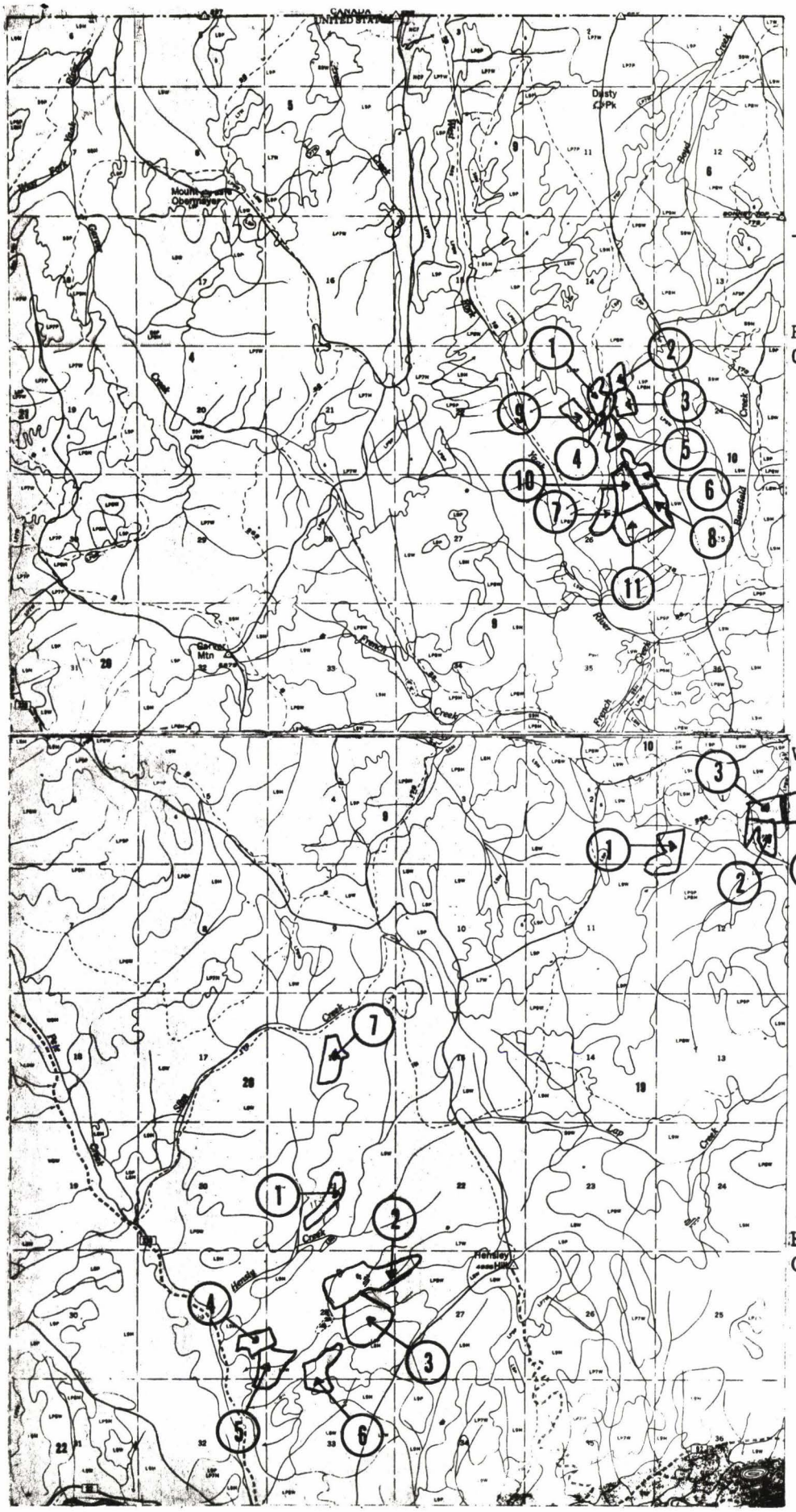
** not cruised in 1979

Table 3.--Unit Information, Yaak Demonstration Areas, Kootenai National Forest, 1979

Unit Name and No.		Habitat type	Elevation (feet)	Aspect	Slope (percent)	Soil type
Waper Creek	1	Tshe/Clun	3,400	SE	30	Till overlain/Luscap
	2	"	"	"	"	"
	3	"	"	"	"	"
	4	"	"	"	"	"
Hensley Creek	1	Thpl/Clun	3,400	SESW	20	"
	2	"	"	"	"	"
	3	"	"	"	"	"
	4	"	"	"	"	"
	5	"	"	"	"	"
	6	"	"	"	"	"
	7	"	"	"	"	"
Benefield Creek	1	Thpl/Clun-Psme/Clun	4,000	SW	35	"
	2	"	"	"	"	"
	3	"	"	"	"	"
	4	"	"	"	"	"
	5	"	"	"	"	"
	6	"	"	"	"	"
	7	"	"	"	"	"
	8	"	"	"	"	"
	9	"	"	"	"	"
	10	"	"	"	"	"
	11	"	"	"	"	"

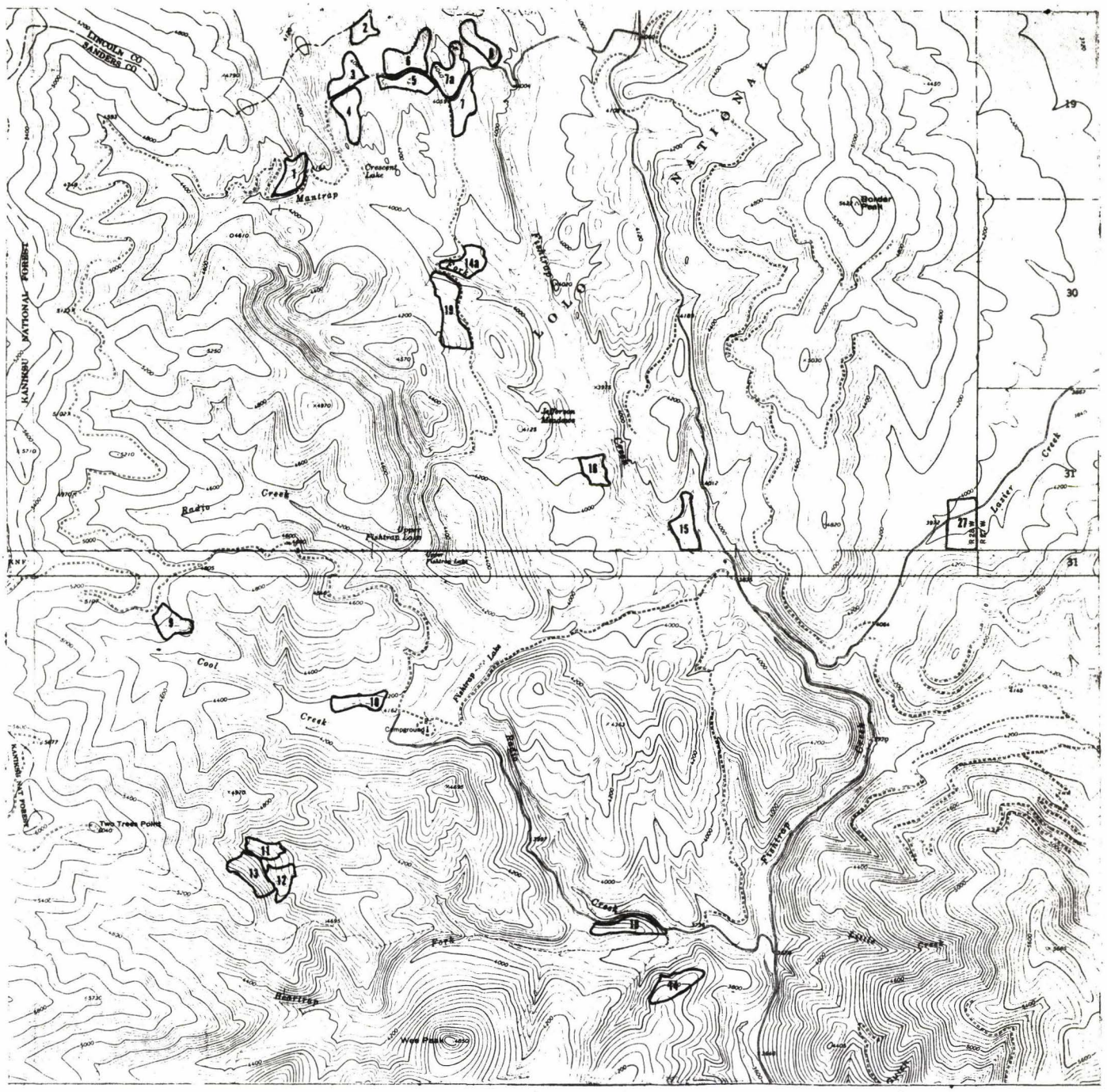
Table 4.--Unit information, Thompson River Demonstration Areas, Lolo NF, 1979

Unit No.	Habitat type	Elevation (feet)	Aspect	Slope (percent)	Soil type
14A	Abgr/Xete	3,900	S	6-15	Andic Ustocrept & Typic Eutroboralf
15	Tsme/Vaca	3,800	SW	6-15	" " " " "
19	Abgr/Xete	4,100	S	6-15	" " " " "
4	Abgr/Libo	4,090	N	6-15	" " " " "
7	Abgr/Xete	4,000	W	6-15	" " " " "
16	Abgr/Libo	3,900	E	6-15	" " " " "
2	Abgr/Libo	4,120	Level & Rolling	6-15	" " " " "
3	Abgr/Libo	4,090	Level & Rolling	6-15	" " " " "
8	Abgr/Libo	4,200	Level & Rolling	6-15	" " " " "
1	Abgr/Libo	4,200	SE	16-25	" " " " "
12	Abgr/Xete	4,650	NE	36-45	" " " " "
5	Abla/Clun	4,100	E	16-25	" " " " "
9	Abgr/Libo	4,120	E	16-25	" " " " "
11	Abla/Clun	4,600	NE	16-25	" " " " "
13	Abgr/Xete	4,970	NE	36-45	" " " " "
6	Abgr/Xete	4,120	NE	6-15	" " " " "
14	Abgr/Libo	4,000	S	6-15	Typic Eutroboralf
10	Abla/Xete	4,160	N	26-35	Andic Ustocrept & Typic Eutroboralf
7A	Abgr/Xete	4,040	NE	6-15	" " " " "
18	Tsme/Caru	3,750	S	16-25	" " " " "
27	Tsme/Libo	3,980	SE	6-15	Typic Eutroboralf & Fine Lake Sediments



Unit No.		Designated cut
Benefield Ck.	1	≥ 7 in.
	2	120 BA
	3	100 BA
	4	80 BA
	5	≥10 in.
	6	≥10 in.
	7	100 BA
	8	120 BA
	9	≥ 7 in.
	10	Check
	11	Check
Waper Ck	1	leave >12 in.
	2	100 BA
	3	80 BA
	4	Check
Hensley Ck	1	≥10 in.
	2	120 BA
	3	80 BA
	4	≥12 in.
	5	≥12 in.
	6	≥ 7 in.
	7	≥12 in.

Fig.1-- Location of demonstration units, Kootenai National Forest, 1979.



UNIT No.	CUTTING STRATEGY	UNIT No.	CUTTING STRATEGY	UNIT No.	CUTTING STRATEGY
1	80 BA	7a	Control	14	120 BA
2	12" DBH	8	12" DBH	14a	7" DBH
3	12" DBH	9	100 BA	15	7" DBH
4	10" DBH	10	120 BA	16	10" DBH
5	80 BA	11	100 BA	18	Control
6	120 BA	12	80 BA	19	7" DBH
7	10" DBH	13	100 BA	27	Control

Fig.2-- Location of demonstration units, Lolo National Forest, 1979.